

# 425 10ESDA-TR1

## Four channel ultra low capacitance ESD Suppressor



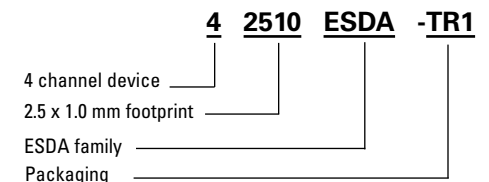
### Applications

- Laptops, notebooks, desktop
- HDTV, set top box
- GPS and Bluetooth communication antenna
- USB 2.0, 3.0 and 3.1
- HDMI 1.3, 1.4a, 2.0
- DisplayPort™
- SATA and eSATA

### Product features

- Ultra low capacitance ESD suppressor ideally suited for protecting high speed data applications with virtually no signal distortion
- Four channel, bi-directional device helps provide significant PCB layout space savings and trace layout complexity
- Maintains an extremely low leakage current at rated voltage
- Provides ESD protection with fast response time (<1 ns) allowing equipment to pass IEC 61000-4-2 level 4 test
- Matches footprint of common higher capacitance DFN2510-10 TVS diode packages

### Ordering part number



### Package suffix

-TR1: 5000 parts on a 7" diameter reel

### Product specifications

Electrical specifications	Minimum	Typical	Maximum	Units
Rated voltage			12	Vdc
Trigger voltage <sup>2</sup>		300		Vdc
Clamping voltage <sup>1</sup>		30		Vdc
Capacitance @ 1 MHz		0.1		pF
Leakage current @ 12 Vdc		0.01		uA
Response time		0.1		ns
ESD Voltage capability to IEC6100-4-2 (contact)	10			kV
ESD Voltage capability to IEC6100-4-2 (air)	15			kV
ESD withstand pulses		1000		Number of pulses

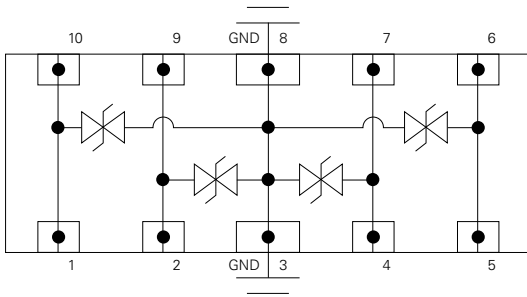
1. Maximum peak voltage with a 8/20 μs waveform and a 1 A pulse current per IEC 61000-4-2 level 4

2. Trigger voltage: Trigger measurement made using Transmission Line Pulse (TLP) method.

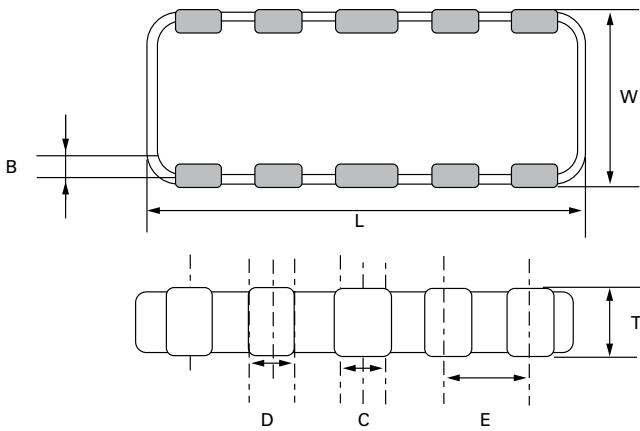


Powering Business Worldwide

**Equivalent circuit**

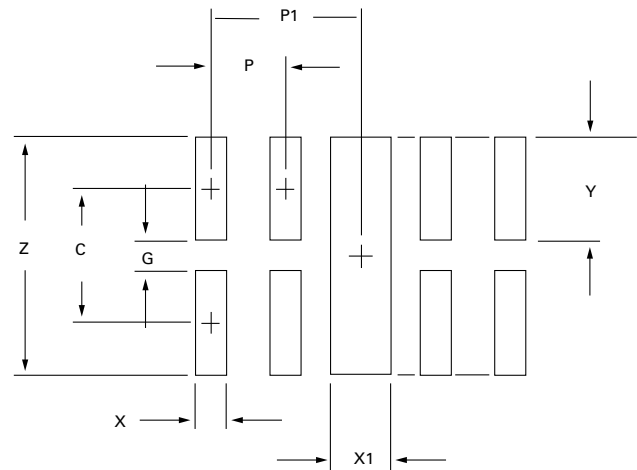


**Dimensions—mm**



L	W	T	B	C	D	E
2.5 ±0.1	1.0 ±0.1	0.5 ±0.1	0.2 ±0.1	0.3 ±0.05	0.2 ±0.05	0.5 ±0.05

**Recommended pad layout**

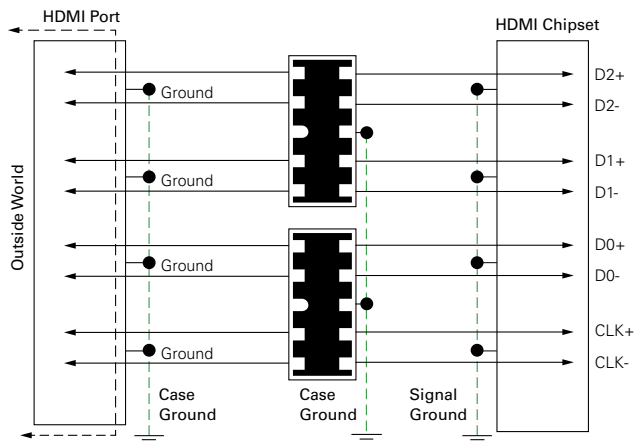


Y	G	Z	X	X1	P	P1	C
0.6	0.2	1.4	0.2	0.3	0.5	1.0	0.8

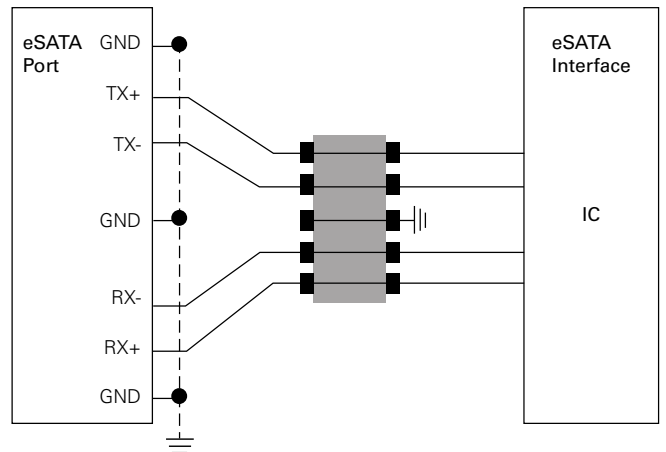
**General specifications**

Operating temperature: - 55 °C to +125 °C
Storage temperature (component): - 55 °C to +125 °C
High temperature load voltage: +125 °C for 1000 hours at rated voltage
Thermal shock: 100 cycles, -55 °C to +125 °C, 30 minuets dwell time
Resistance to solder heat: +260 °C ±5 °C 10 seconds
Moisture sensitivity level (MSL): 2

**HDMI layout**

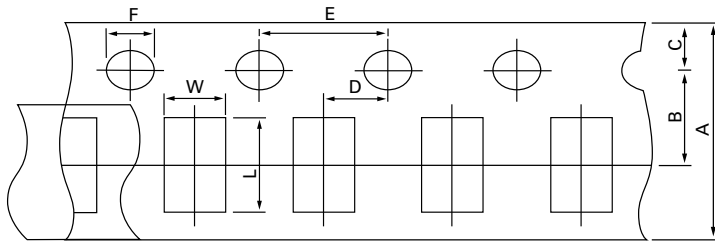


**eSATA layout**



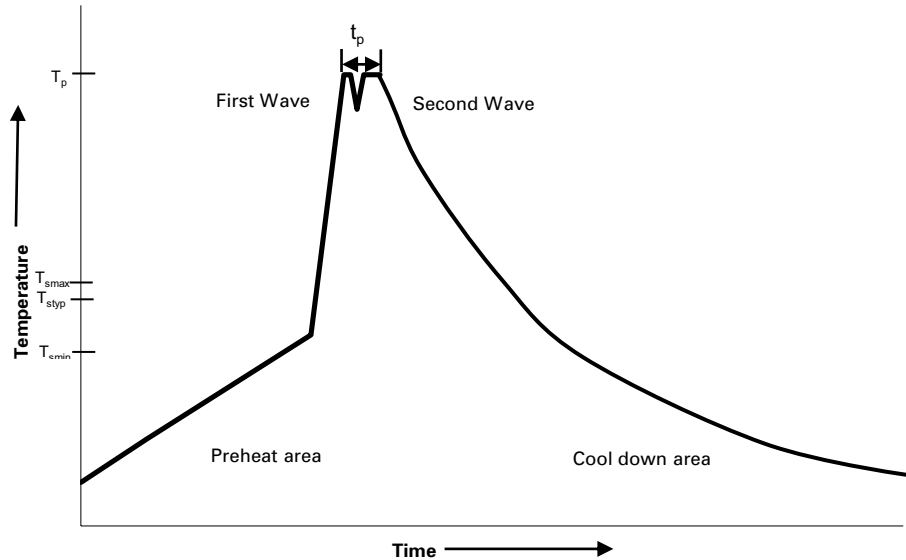
**Packaging information- mm**

Supplied in tape and reel packaging, 5000 parts per seven inch (178 mm) reel per EIA Standard 481-1



A	B	C	D	E	F	L	W
8.0 ±0.30	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	4.00 ±0.10	1.5 ±0.10	2.9 ±0.20	1.40 ±0.20

**Wave solder profile**



**Reference EN 61760-1:2006**

Profile feature	Standard SnPb solder	Lead (Pb) free solder
Preheat		
• Temperature min. ( $T_{smin}$ )	100 °C	100 °C
• Temperature typ. ( $T_{styp}$ )	120 °C	120 °C
• Temperature max. ( $T_{smax}$ )	130 °C	130 °C
• Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	70 seconds	70 seconds
$\Delta$ preheat to max Temperature	150 °C max.	150 °C max.
Peak temperature ( $T_p$ )*	235 °C – 260 °C	250 °C – 260 °C
Time at peak temperature ( $t_p$ )	10 seconds max 5 seconds max each wave	10 seconds max 5 seconds max each wave
Ramp-down rate	~ 2 K/s min ~3.5 K/s typ ~5 K/s max	~ 2 K/s min ~3.5 K/s typ ~5 K/s max
Time 25 °C to 25 °C	4 minutes	4 minutes

**Manual solder**

+280 °C (3 seconds maximum by soldering iron), generally manual/hand soldering is not recommended.

**Solder reflow profile**



**Table 1 - Standard SnPb solder (T<sub>C</sub>)**

Package thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5 mm)	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

**Table 2 - Lead (Pb) free solder (T<sub>C</sub>)**

Package thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

**Reference J-STD-020**

Profile feature	Standard SnPb solder	Lead (Pb) free solder
Preheat and soak		
• Temperature min. (T <sub>smin</sub> )	100 °C	150 °C
• Temperature max. (T <sub>smax</sub> )	150 °C	200 °C
• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-120 seconds	60-120 seconds
Ramp up rate T <sub>L</sub> to T <sub>p</sub>	3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T <sub>L</sub> )	183 °C	217 °C
Time (t <sub>L</sub> ) maintained above T <sub>L</sub>	60-150 seconds	60-150 seconds
Peak package body temperature (T <sub>p</sub> )*	Table 1	Table 2
Time (t <sub>p</sub> )* within 5 °C of the specified classification temperature (T <sub>C</sub> )	20 seconds*	30 seconds*
Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )	6 °C/ second max.	6 °C/ second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

\* Tolerance for peak profile temperature (T<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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